Analyzing Calls to the Mayor's 24-hour Hotline

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Projection: NAD 1983 Massachusetts Mainland State Plane

Data Sources: U.S. Census Bureau, MassGIS, and the City of Boston

Introduction

This analysis examines the spatial differences among calls made to Boston City Hall by residents of the city regarding various issues and concerns they have. The calls arrived via the mayor's 24-hour hotline, and are classified under one of a few dozen categories, such as noise complaints, requests for graffiti removal, or locations of streetlights that are no longer functioning. Note that calls to the police and fire departments are not received via the hotline, and so are not included in the hotline data set.

The city has been logging calls to the hotline via their online data clearinghouse at data.cityofboston.gov since July 1, 2011, resulting in a data set of over half a million calls. This analysis uses a full 12-months of data: all calls between December 1, 2013 and November 30, 2014, producing a data set of 140,771 total calls across all issues. These calls were narrowed down to three specific issues: problems with garbage/recycling/yard waste pick up, reports about rodent activity, and requests for pothole fixes.

Each call has an associated address, as well as latitude and longitude coordinates, enabling analysts to map call distribution. Call points can be joined to any number of polygon shape files, including blocks, block groups, tracts and neighborhoods. From these joins, new shape files are created in which each polygon contains data for all calls that took place inside the given polygon.

Methodology & Limitations

For each of the three issues, U.S. Census block groups are used to show differentiation across the city in terms of issue location. The City of Boston's hotline database still needs improvement to increase accuracy, as some calls are given latitude and longitude coordinates corresponding to Boston City Hall. In certain instances, calls were made about a problem somewhere else in the city, such as in the case of someone from Mission Hill complaining about a pothole in Back Bay. The lag/long coordinates in these instances are typically classified appropriately to the location of the issue itself, but are occasionally misclassified to the address of the caller.

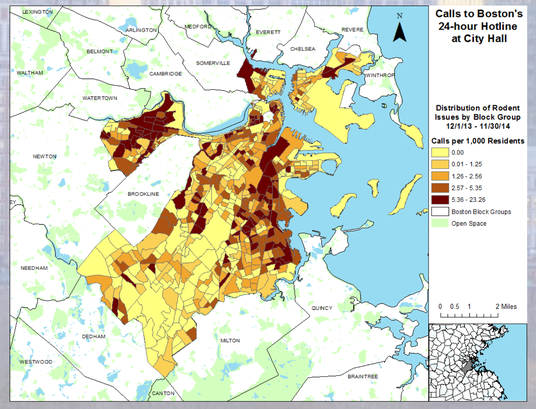
The first map for each issue below shows the relative number of calls among block groups, normalized by population (calls per 1,000 people) or geographic size (calls per acre), depending on the strengths and weaknesses of each issue's data set. The second map shows hot and cold spots, with H standing for a high relative number of calls and L standing for a low relative number of calls. The first letter is representative of the block group itself, while the second letter is representative of nearby block groups. "HH" for example means that a block group has a high relative number of calls, and is also near block groups that also have a high number of calls. "LH" is a block group with a low number of calls situated near block groups with a high number of calls.

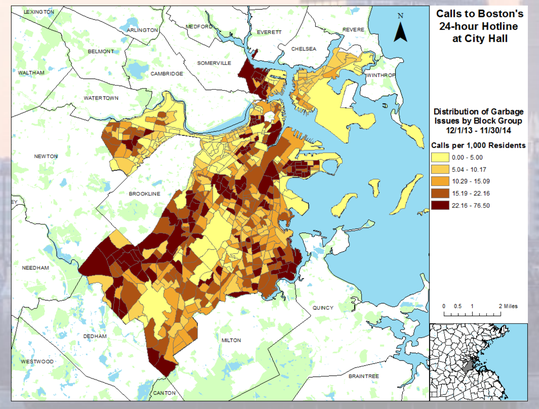
Results

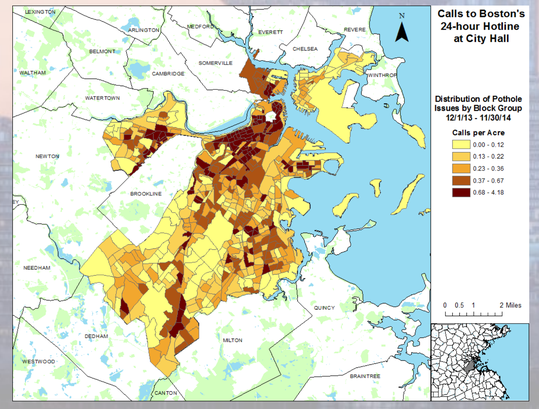
Each issue shows clear variation among block groups in regard to where calls are most prevalent, and where corresponding hot and cold spots have manifested. These results tell city officials where efforts to improve services might be best directed. An additional line of analysis I conducted was to investigate divergence for each issue between environmental justice (EJ) block groups and non-environmental justice (non-EJ) block groups. While there is not room on this poster to display those results, the table at left shows the results. Both sets of block groups had the exact same number of calls per 1,000 residents regarding rodents, while non-EJ block groups had significantly more calls per 1,000 residents regarding garbage and potholes. For all three issues, EJ block groups had more calls per acre.

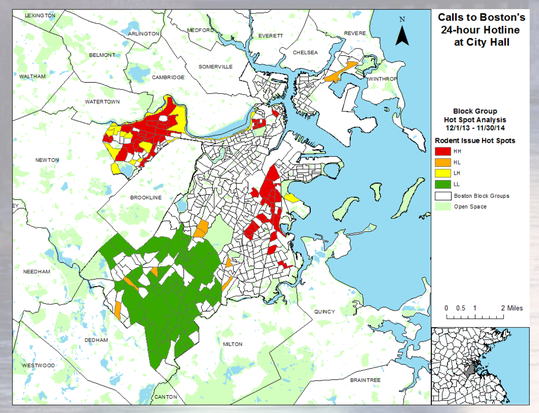
	EJ Block Groups	Non-EJ Block Groups
Population	456,403	159,886
Acres	19,668.16	11,449.18
People per Acre	23.21	13.96
Garbage Calls	5,371	2,899
Garbage Issues per 1,000 Residents	11.77	18.13
Garbage Issues per Acre	0.273	0.253
Rodent Calls	1,260	441
Rodent Issues per 1,000 Residents	2.76	2.76
Rodent Issues per Acre	0.064	0.039
Pothole Calls	5,408	2,575
Pothole Issues per 1,000 Residents	11.85	16.11
Pothole Issues per Acre	0.275	0.225

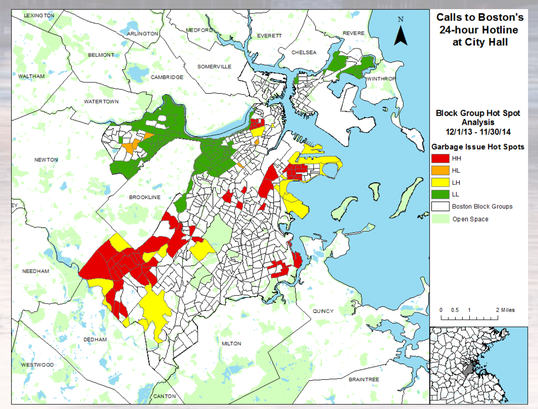
City of Boston.gov
Official Web Site of the City of Boston

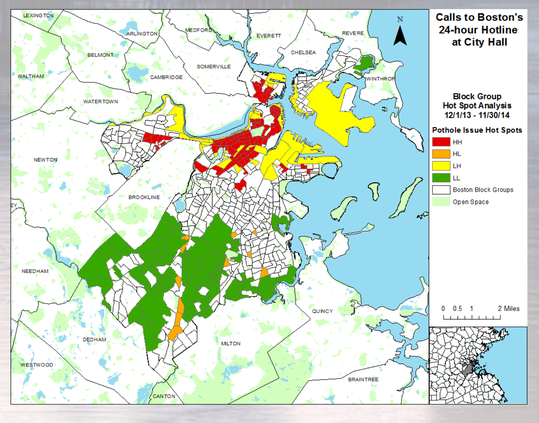












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The biggest issue that remains for the city is to determine the extent to which calls are a representative sample of actual problems. Are people in certain neighborhoods more inclined to call the city when their garbage is not picked up by the hauler? To what extent is knowledge of the hotline distributed across different block groups? While these maps and their associated data may provide insights for municipal employees as to where services should be targeted, there needs to be some degree of confidence that calls coming in to the hotline are leading to services being directed in an equitable fashion. As the saying goes, the squeaky wheel gets the grease, but are the squeaky wheels in these cases truly experiencing the most trouble?

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